IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:	Schipper	Confirmation No. 4559
Serial No.:	10/762,095	
Filed:	January 21, 2004	
For:	Apparatus for removing air and/or debris from a flow of liquid	
Group Art Unit:	1797	
Examiner:	Kurtz, Benjamin	
Attorney Docket No.	TCI-P003	

APPEAL BRIEF

Mail Stop Appeal Brief-Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This is an appeal following the Official Action mailed May 2, 2008. The Official objected the specification for including new matter, rejected claims 43, 49, and 53 under 35 U.S.C. 112, first paragraph; claims 21, 24, 49, 50, 60, and 61 has being anticipated by U.S. Patent No. 5,443,724 to Williamson et at. (hereinafter "Williamson"); claims 1, 27-29, 31-35, 43-45, 51, 52, and 62 under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,893,485 to MacDuff (hereinafter "McDuff") in view of U.S. Patent No. 5,550,132 to Elmi (hereinafter "Elmi") and U.S. Patent No. 4,443,346 to Muller (hereinafter "Muller"); claims 36-38, 41, 42, 53-57, and 59 under 35 U.S.C. 103(a) as being unpatentable over MacDuff in view Elmi and U.S. Patent No. 5,676,740 to Schwartz et al. (hereinafter "Schwartz"); claims 21-23, 49, and 50 under 35 U.S.C. 103(a) as being unpatentable over MacDuff in view of Elmi and U.S. Patent No. 5,490,874 to Kuster et al. (hereinafter "Kuster") or U.S. Patent No. 3,668,822 to Mannion et al. (hereinafter "Mannion"); claims 24-26 under 35 U.S.C. 103(a) as being unpatentable over MacDuff in view of Elmi and Mannion; claims 39 and 40 under 35 U.S.C. 103(a) as being unpatentable over

MacDuff in view of Elmi and Schwartz and further in view of Mannion; claim 5 under 35 U.S.C. 103(a) as being unpatentable over MacDuff in view of Elmi and Muller in view of U.S. Patent No. 4,051,033 to Blace (hereinafter "Blace"); and claim 30 under 35 U.S.C. 103(a) as being unpatentable over MacDuff in view of Elmi and Muller in view of U.S. Patent No. 4,985,182 to Basse et al. (hereinafter "Basse").

I. Real Party in Interest

The real party in interest is Thrush Co., Inc. located at 340 West 8th Street, Peru, Indiana 46970.

II. Related Appeals and Interferences

There are no other appeals or interferences known to Appellant, the Appellant's legal representative or assigns which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

III. Status of Claims

Allowed claims:	None
Claims objected to:	None
Claims rejected:	1, 5, 21-47, 49-57, and 59-62
Claims cancelled:	2-4, 6-20, 48, and 58
Claims appealed:	1, 5, 21-47, 49-57, and 59-62

IV. Status of Amendments

The amendment to the specification of the August 29, 2007 is objected to. It is the Applicant's understanding that his amendment has been entered and that the Official Action is requesting that the Applicant cancel the subject matter of the amendment. Thus, the Applicant believes that the amendment to the specification has been made and that there are no amendments that have not been entered.

V. Summary of Claimed Subject Matter

The following explanation of the subject matter defined in each of the independent claims is provided with reference to page, paragraph, and line numbers in the specification, and the

drawings by reference characters as required by §41.37(c)(v). These references are made to a specific embodiment(s) disclosed in the application and do not limit the scope of the independent claims to the specific embodiment(s) and should not necessarily be considered to be exhaustive.

Claim 1

The subject matter defined in claim 1 relates to an apparatus 10 (Fig. 1, page 5, paragraph [0015], line 2) for removing air or debris from a flow of liquid. The apparatus 10 comprises a shell 18 having an inlet 20, an outlet 22, and an inner cavity 24 in fluid communication with each of the inlet 20 and the outlet 22 (page 5, paragraph [0015], lines 4 and 5); and at least one elongate coalescing medium assembly 30 disposed within the cavity 24 of the shell 18 (page 5, paragraph [0015], line 8). Each coalescing medium assembly 30 includes a plurality of wire mesh tubes 50 oriented substantially parallel to each other (Fig. 2, page 6, paragraph [0017], lines 4 and 5), each wire mesh tube 50 having ends, a longitudinal axis extending between the ends, and a side wall extending between the ends, and the flow of liquid being directed to travel in a radial direction across the plurality of wire mesh tubes 50 to radially enter and radially exit the side walls of the plurality of wire mesh tubes 50 (see Fig. 1); the at least one assembly 30 further including at least one elongate core element 48 (see Fig. 5, page 6, paragraph [0017], lines 2 and 3) contacting the plurality of wire mesh tubes 50 and oriented substantially parallel to the plurality of wire mesh tubes 50, the elongated core element 48 having a rigidity greater than the wire mesh tubes 50 to support the plurality of wire mesh tubes 50 against the flow of liquid in the radial direction across the plurality of wire mesh tubes 50.

Claim 5

The subject matter defined in claim 5 relates to end cap 133 including a plurality of recesses 135, an end of each of the core elements 148 being received in a respective one of the recesses (page 11, paragraph [0032], lines 1-4).

Claim 21

The subject matter defined in claim 21 also relates to an apparatus 10 (Fig. 2, page 5, paragraph [0015], line 2) for removing air or debris from a flow of liquid. The apparatus 10 comprises a shell 18 having an inlet 20, an outlet 22, and an inner cavity 24 in fluid communication with each of the inlet 20 and the outlet 22 (page 5, paragraph [0015], lines 4 and

5), the inner cavity 24 having a direct flow path space positioned directly between the inlet 20 and outlet 22 (see Fig. 1), and a plurality of tubes 50 positioned within the inner cavity 24 of the shell 18 such that the tubes 50 are oriented substantially parallel to each other and upper ends of the tubes 50 being positioned above the inlet (see Fig. 1). Each of the tubes 50 have a longitudinal axis and at least one of the tubes 50 has a surface with a plurality of apertures. A minority portion of the plurality of tubes 50 being positioned in the direct flow path space with the flow of fluid between the inlet 20 and outlet 22 flowing directly across the minority portion of the plurality of tubes 50 in a substantially radial direction (see Fig. 1). A majority portion of the plurality of tubes 50 being larger than the minority portion of the plurality of tubes 50 and positioned outside of the direct flow path space (see Fig. 1) and an air vent 26 positioned to release air that is removed from the flow of liquid by the plurality of tubes 50 (page 5, paragraph [0015], line 6).

Claim 24

The subject matter defined in claim 24 relates to shell 18 further comprises a bottom section 28 (Fig. 1, page 5, paragraph [0015], lines 7-page 6, line 3] including an aperture that is substantially smaller than the inlet and configured to permit removal of debris that settles out of the flow of liquid.

Claim 28

The subject matter defined in claim 28 relates to each coalescing medium assembly 30 further including a coupling element 52 (see Fig. 2, page 9, paragraph [0025]) surrounding the plurality of wire mesh tubes and holding the plurality of wire mesh tubes together.

Claim 29

The subject matter defined in claim 29 relates to each coalescing medium assembly 30 including a band 82 (see Fig. 2, page 9, paragraph [0027] wrapped around the coupling element 52 and holding the coupling element 52 in engagement with the plurality of wire mesh tubes 50.

Claim 30

The subject matter defined in claim 30 relates to at least one of the wire mesh tubes 50 includes a wire mesh projection 64 extending from an inner surface of the wire mesh tube 50 and into an interior of the wire mesh tube 50 (see Fig. 5, pages 7 and 8, paragraphs [0020-0022] .

Claim 31

The subject matter of claim 31 also relates to an apparatus 10 (Fig. 1, page 5, paragraph [0015], line 2) for removing air or debris from a flow of liquid. The apparatus 10 comprises a shell 18 having an inlet 20, an outlet 22, and an inner cavity 24 in fluid communication with the inlet 20 and the outlet 22 (page 5, paragraph [0015], lines 4 and 5); and at least one elongate coalescing medium assembly 30 disposed within the inner cavity 24 of the shell 18 (page 5, paragraph [0015], line 8). Each coalescing medium assembly 30 including at least one elongate core element 48 (see Fig. 5, page 6, paragraph [0017], lines 2 and 3); and a plurality of wire mesh tubes 50 (page 6, paragraph [0017], lines 4 and 5). Each of the wire mesh tubes 50 having a longitudinal axis. The wire mesh tubes 50 cooperating to define at least one interior space therebetween. The at least one elongate core element 48 having a rigidity greater than the plurality of wire mesh tubes 50 and being positioned within the interior space in an orientation substantially parallel to the plurality of wire mesh tubes 50 to support the plurality of wire mesh tubes against the flow of liquid through the apparatus 10.

Claim 32

The subject matter defined in claim 32 relates to an end cap 133 including at least one recess 135, an end of each of the elongate core elements 148 being received in a respective one of the recesses 135 (page 11, paragraph [0032], lines 1-4).

Claim 34

The subject matter of claim 34 relates the wire mesh tubes 50 arranged in a substantially circular pattern when viewed along the longitudinal axes of the wire mesh tubes 50 such that each wire mesh 50 tube engages two adjacent ones of the wire mesh tubes 50 (see Fig. 5) .

Claim 36

The subject matter of claim 36 also relates to an apparatus 10 (page 5, paragraph [0015], line 2) for removing air or debris from a flow of liquid. The apparatus 10 comprises a shell 18 having an inlet 20, an outlet 22, and an inner cavity 24 in fluid communication with each of the inlet 20 and the outlet 22 (page 5, paragraph [0015], lines 4 and 5); and at least one elongate coalescing medium assembly 30 disposed within the inner cavity 24 of the shell 18 (page 5, paragraph [0015], line 8). Each coalescing medium assembly 30 including a plurality of wire mesh tubes 50 oriented substantially parallel to each other (page 6, paragraph [0017], lines 4 and 5). Each wire mesh tube 50 has ends and a longitudinal axis extending between the ends and the flow of liquid flowing in a direction substantially transverse to the longitudinal axis of the plurality of wire mesh tubes. Each coalescing medium assembly 30 further comprises a wire mesh retaining wall 52 surrounding the plurality of tubes 50 (Fig. 2, page 6, paragraph [0017], lines 6-8).

Claim 41

The subject matter of claim 41 relates to at least one coalescing medium assembly 30 further comprising at least one elongate core element 48 (see Fig. 5, page 6, paragraph [0017], lines 2 and 3) oriented substantially parallel to the plurality of wire mesh tubes 50 to support the plurality of wire mesh tubes 50 against the flow of liquid through the apparatus 10.

Claim 60

The subject matter of claim 60 relates to a first segment of the majority portion of the plurality of tubes 48 being positioned below the direct flow path space and the first segment is larger than the minority portion of the plurality of tubes (see Fig. 1).

Claim 61

The subject matter of claim 61 relates to a second segment of the majority portion of the plurality of tubes 50 being positioned above the direct flow path space across the direct flow path space from the first segment and the second segment is larger than the minority portion of the plurality of tubes 50 (see Fig. 1).

Claim 62

The subject matter of claim 62 relates to the at least one elongate coalescing medium assembly 130 including a plurality of elongate coalescing medium assemblies 130 and at least one of the elongate coalescing medium assembly 130 is centered between the other elongate coalescing medium assemblies 130 (see Fig. 7, page 10, paragraph [0030], lined 1-9).

VI. Grounds to be Reviewed on Appeal

The Examiner has objected the specification for including new matter and rejected claims 43, 49, and 53 under 35 U.S.C. 112, first paragraph for including this alleged new matter. The Examiner rejected claims 21, 24, 49, 50, 60, and 61 has being anticipated by Williamson; claims 1, 27-29, 31-35, 43-45, 51, 52, and 62 as being unpatentable over MacDuff in view of Elmi and Muller; claims 36-38, 41, 42, 53-57, and 59 as being unpatentable over MacDuff in view Elmi and Schwartz; claims 21-23, 49, and 50 as being unpatentable over MacDuff in view of Elmi and Kuster or Mannion; claims 24-26 as being unpatentable over MacDuff in view of Elmi and Mannion; claims 39 and 40 as being unpatentable over MacDuff in view of Elmi and Schwartz and further in view of Mannion; claim 5 as being unpatentable over MacDuff in view of Elmi and Muller in view of Blace; and claim 30 as being unpatentable over MacDuff in view of Elmi and Muller in view of Basse. Accordingly, several issues are before the Honorable Board of Appeals. First, whether the Examiner's objection to the specification and corresponding claims is proper. Second, whether Williamson anticipates claims 21, 24, 49, 50, 60, and 61. Finally, whether the Examiner is relying on hindsight reconstruction rather than properly applying the *Graham* factors and common sense to reject the remaining claims as obvious.

VII. Argument

OBJECTION OF THE SPECIFICATION AND RELATED CLAIM REJECTIONS

Specification

The Official Action objected to the amendment filed 8/29/07 under 35 U.S.C. 132(a) because it allegedly introduced new matter. The Applicant respectfully disagrees with the

Official Action. As shown in Fig. 1 of the application as filed, inlet 20 and outlet 22 are clearly devoid of restrictions. Thus, the subject matter of the 8/28/07 amendment is supported by the application as originally filed. This position is supported by the Declaration of Aaron Schipper, (Evidence Appendix, see paragraph 3). Further the Examiner ignores the evidence of this declaration that indicates that increasing efficiencies by reducing flow restrictions are inherent. Paragraph [0025] of the present application discusses the high flow rate of rate (up to 3,500 gallons/minute) of apparatus 10 and the forces generated thereby on tubes 48, 50. Common sense dictates that one of ordinary skill in the art would not inherently put flow restrictions within inlet 20 and outlet 22 that would increase inefficiency and require larger pumps to maintain an equivalent flow rate through apparatus 10. Further, shell 18 enlarges the cross-section flow area where flow restrictions, such as tubes 48, 50 are placed. Whereas, inlet 20 and 22 have smaller cross-section flow areas precisely because they are devoid of flow restrictions and do not require larger cross-sectional flow area to compensate for flow restrictions.

Also of note is that the Official Action indicates that Williamson teaches an outlet (24) devoid of restrictions by simply referencing Figure 4 of Williamson. Similarly, in rejecting claims 27, 43, and 44 on page 6, second full paragraph, the Official Action indicates that MacDuff is devoid of flow restrictions. It is curious to the Applicant how the Official Action can readily conclude that Williamson and MacDuff teach this features with no more than referencing figures, but finds the Applicant's arguments unpersuasive based on the figures of the present application, a signed declaration, and the Applicant's arguments stated above. Rather than give weight to the Declaration of Aaron Schipper and common sense, the Official Action continues to maintain the object to the amendment filed 8/29/07. Remove of the objection is respectfully requested.

Claim Rejections Relating to the Objection of the Specification

Claims 43, 49, and 53 were rejected because the specification does not indicate the outlet being devoid of restrictions. The specification was previously amended to indicate that outlet 22 is devoid of restrictions. The support for this amendment is discussed above and in the Declaration of Aaron Schipper (Evidence Appendix, see paragraph 3). Removal of the rejection is respectfully requested.

REJECTION OF CLAIMS 21, 24, 49, 50, 60, 61

AS ANTICIPATED BY WILLIAMSON

Claim 21

The Official Action rejected claims 21, 24, 49, 50, 60, and 61 under 35 U.S.C. §102(b) as being anticipated by Williamson. Claim 21 requires and Williamson fails to teach or suggest "a shell having an inlet, an outlet, and an inner cavity in fluid communication with each of the inlet and the outlet, the inner cavity having a direct flow path space positioned directly between the inlet and outlet, and a plurality of tubes positioned within the inner cavity of the shell..., a minority portion of the plurality of tubes being positioned in the direct flow path space with the flow of fluid between the inlet and outlet flowing directly across the minority portion of the plurality of tubes in a substantially radial direction, a majority portion of the plurality of tubes being larger than the minority portion of the plurality of tubes and positioned outside of the direct flow path space." As shown in Fig. 4 of Williamson, most or all of tubes 20 of Williamson are positioned in the flow path between inlet 14 and outlet 24. Whereas claim 21 requires the ***majority*** portion of the tubes to be positioned ***outside*** of the flow path space. Clearly, Williamson does not teach the limitations of claim 21. Furthermore, claim 21 requires that the flow of fluid be ***directly across*** the minority portion of the plurality of tubes. As shown in Fig. 4 of Williamson, the flow of fluid through tubes 20 is inward and outward, not directly across tubes 20 as required by claim 21. Removal of the rejection of claims 21, 24, 49, 50, and 60 is respectfully requested.

Claim 24

Claim 24 requires that the shell further include a ***bottom*** section including an aperture configured to permit removal of debris. The Official Action points to an unlabeled element near reference numbers 18, 20 for this feature and ignores clearly labelled drain 34 in the same figure. As shown in Figs. 3a, 4 5, and 6, drain 34 of Williamson is always downstream of tubes 20 and labelled. Presumably, drain 34 is positioned downstream to facility draining matter than naturally collects downstream of the tubes 20. Rather than be downstream, the unlabeled component the Official Action suggests teaches the requirement of this claim is not described

and is clearly upstream of the tubes 20, unlike drain 34. As such, the element of Williamson does not teach the requirements of claim 24. Removal of the rejection of claim 24 is respectfully requested.

Claim 60

Claim 60 requires a first segment of the majority portion of the plurality of tubes is positioned below the direct flow path space and the first segment is larger than the minority portion of the plurality of tubes. The Official Action does nothing more than regurgitate the claim language and point to Fig. 4 of the Williamson in making the rejection, leaving the Applicant at a loss for the substance of the rejection. Further, the flow path of Williamson starts below tubes 20 at the exit of inlet 14. Thus, it is impossible for a portion of the tubes 20 of Williamson to be below the flow path. As a result, Williamson does not teach the requirements of this claim. Removal of the rejection is respectfully requested.

Claim 61

Claim 61 requires a second segment of the majority portion of the plurality of tubes is positioned above the direct flow path space across the direct flow path space from the first segment and the second segment is larger than the minority portion of the plurality of tubes. Again, the Official Action does nothing more than to again regurgitate the claim language and point to Fig. 4 of the Williamson. Further, the flow path of Williamson ends above tubes 20 at the entry to outlet 24. Thus, it is impossible for a portion of the tubes 20 of Williamson to be above the flow path. As a result, Williamson does not teach the requirements of this claim. Removal of the rejection is respectfully requested.

REJECTION OF CLAIMS 1, 27-29, 31-35, 43-45, 51, 52, AND 62 AS UNPATENTABLE OVER MACDUFF IN VIEW OF ELMI AND MULLER

Claims 1 and 31

The Official Action rejected claims 1, 27-29, 31-38, 41, 42, 48-59, and 62 under 35 U.S.C. §103 as being unpatentable over MacDuff in view of Elmi and Muller.

The Official Action suggests it would be obvious to combine the teachings of MacDuff, Elmi, and Muller to arrive at the inventions of claim 1 and 31. As suggested below, the Official Action repeatedly uses hindsight to pull together bits and pieces of these references to form the suggested combination, while ignoring the fact that the references relate to much different systems and that the references themselves point away from the suggested combination. This selective picking and choosing is classic hindsight reconstruction, not obviousness.

First, MacDuff, Elmi, and Muller are significantly different systems. For example, MacDuff is designed to remove air from liquid in a hydronic system. Whereas, Elmi is designed to remove liquids (oils) from liquids (water) from a subterranean system. Unlike other mechanical arts, the fluid dynamic arts can be unpredictable. Thus, what may be beneficial in a liquid/liquid system may not be beneficial in a gas/liquid system (see also Evidence Appendix, paragraph 6 of the Declaration of Aaron Schipper). Rather than recognize the unpredictable nature of combining components of liquid/liquid systems with gas/liquid systems, the Official Actions moves forward with hindsight combinations of multiple references. Furthermore, as stated below, the Examiner indicated that the level of ordinary skill in the art was "low." The Applicant finds it incredible that one of a low level of skill in the art would find it so obvious to mix and match components of different filtering systems that filter different media from different fluids.

Next, it appears that MacDuff is intended for a hydronic system (see paragraph 4 of the Declaration of Aaron Schipper) in which the fluid is cycled over the device of MacDuff multiple times giving a single tube multiple chances to collect air, whereas the device of Elmi appears to be a single pass system (see paragraph 5 of the Declaration of Aaron Schipper), which requires multiple tubes to collect as much liquid in the signal pass. Thus, the suggested motivation to use the multiple tubes of Elmi in a single pass system is unnecessary in the multiple pass system of MacDuff.

Additionally, MacDuff already appears to provide the ability for "lighter material" to contact subsequent wires by providing additional contact area. For example, as shown in Fig. 1 of MacDuff, element 17 includes multiple wrapped layers. Any material not contacted by the first layer of element 17 will have the ability to be contacted by a downstream layer of element 17. Thus, the suggested benefit of modifying MacDuff in view of Elmi is already provided in MacDuff without the proposed modification (i.e. additional surface area is already provided). Thus, the proposed modification provides no additional benefit. This is yet another example of

the Official Action using hindsight. It this particular instance, the Office Action ignores the teachings of even the base reference, MacDuff.

Further, providing multiple tubes would appear to be more expensive than a single element 17 with multiple layers as taught by MacDuff and provides no additional benefit. For example, rather than a single element, as with element 17 of MacDuff, multiple elements must be provided in the proposed combination, which will cost more to manufacture and take additional time to assemble. Thus, the proposed combination provides no suggested additional benefit and potentially costs more to manufacture and assemble. Common sense dictates the adding cost without adding benefit is not obvious. Thus, it is the Applicant's belief that hindsight, rather than common sense (see *KSR)*, is driving the proposed combination.

Further, the Official Action appears to be selective in picking and choosing the elements of Elmi to combine with MacDuff. For example, Elmi suggests the use of perforated tubes, which increases the surface area to maximize the efficiency (see column 5, lines 5-7, of Elmi). Rather than carryover this teaching of Elmi to MacDuff, the Official Action ignores this benefit and continues to use the wire tube of MacDuff in the combination, which will have less surface area and be less efficient as suggested by Elmi. Thus, the proposed combination conveniently uses one alleged teaching of Elmi (that provides no apparent additional benefit than already provided in MacDuff), while conveniently ignoring a stated beneficial teaching. Again, hindsight reconstruction appears to overwhelm the teachings of the applied art.

Within the same rejection discussed above, the Official Action looks to a fundamentally different system of filtration (particulate screening from a liquid in Muller) for particular claimed features to modifying another filtration system (air removal from a liquid in MacDuff), which has already been modified with yet another filtration system (liquid removal from a liquid in Elmi). Muller relates to a filter system that suffers from solids that cake on a cloth filter (see the abstract). As shown in Fig. 1 of Muller, filter cloth 2 is positioned over *elastic* tubes 1 to collect materials that cakes over cloth 2 and must be cleaned from cloth 2 by radial pulsating action through central tube 5. The only purpose of elastic tubes 1 and central tube 5 appears to be as a support of filter cloth 2 to provide pulsation rather than providing any coalescing function.

Rhetorically, the Applicant must ask why the Official Action turns to a caking filter system that uses elastic tubes 1 that support a filter cloth 2 when looking to modify the fundamentally different coalescing system of MacDuff. The apparent answer is hindsight reconstruction using the teachings of the present application. Why else would one turn to the

system of Muller that has admitted caking issues and requires filter cloth 2? Ignoring the stated caking problems of Muller, the Official Action suggests providing filter cloth 2 of Muller to MacDuff even though such a combination would clog MacDuff and be redundant. In fact, on page 19, first full paragraph, the Official Action suggests that the "filter cloth of Muller would be added as desired by one of ordinary skill in the art to provide some filtering capabilities for the system." Clearly, such a cloth 2 would unnecessarily clog the system of MacDuff, which *already has* filtering capabilities. Once again, the Official Action suggests a modification the detracts (by clogging) from the operation of a device without any demonstrated benefit. If MacDuff is not provided with the filter cloth 2, there is no reason to provide the support and cleaning structure of Muller to MacDuff.

Further, it appears that "support central tube 5" of Muller provides only vertical support to perforated tubes 1 against gravity. See, for example, Fig. 2 of Muller. Other than gravity, alternating vacuum and pressure, not fluid flow across tubes 1, appear to be the only source of force on tubes 1 of Muller. Central support tube 5 provides no additional support against tubes 1 from collapsing under vacuum pressure or expanding under pressure. Rather, it appears the only support provided by tube 5 of Muller to tubes 1 is for vertical support against gravity. The tubes of the proposed MacDuff and Muller combination are not suspended as in Muller. Thus, there appears to be no common sense reason to provide tube 5 of Muller to the proposed combination of MacDuff and Elmi. Again, hindsight provides the road map to the rejection.

In addition to the impermissible use of hindsight to form the rejections, the Official Action fails to show how each and every limitation of the claims is taught by the proposed combination. For example, the Official Action states that the alleged elongated core element 5 of Muller has a rigidity greater than the wire mesh tubes referred to in claim 1 (and 31). However, the Official Action provides no support in Muller for this conclusion. Thus, the Applicant must assume that the Official Action is either once again impermissibly relying on hindsight or impermissibly speculating as the rigidity of tube 5 of Muller.

For the Official Action to establish a *prima facie* case of obviousness, it must follow the guidelines set forth by the Supreme Court in *Graham v. John Deere* that is required "in each and every case." See MPEP §2141. These guidelines include 1) determining the scope and contents of the prior art; 2) ascertaining the differences between the prior art and the claim in issue: 3) resolving the level of ordinary skill in the art; and 4) evaluating evidence of secondary

considerations. The Official Action fails to fully address at least items 3 and 4. Because of this failure to consider each of the *Graham* factors, the Official Action does not establish obviousness.

When asked about the level of ordinary skill in the art, the Examiner suggested that it was "low." The Examiner suggested this level of ordinary skill because of the simple construction of the claimed device, namely wire mesh tubes. Because of such a low level of skill, one of ordinary skill in the art would not look to an oil/water system, such as Elmi, for motivations to benefit an air/liquid system, such as MacDuff. Even if one of such low skill in the art were to look to such a different system, one of such low skill in the art would not be able to predict if coalescing function of a liquid/liquid system would carryover to a gas/liquid system (see paragraph 6 of the Declaration of Aaron Schipper).

Further if one of such low ordinary skill in the art were to look to another teaching, the person of low skill in the art would surely adopted the express suggestions of the teaching rather than turning away from such teaching. For example, as stated above, Elmi teaches the use of perforated tube, which having greater surface area than the claimed wire mesh tubes. As mentioned above, Elmi suggests that increased surface area increase efficiency. Thus, when looking to Elmi for motivations to modify MacDuff, one of such low skill would replace the wire of MacDuff with a perforated tube. Rather the Official Action demonstrates an uncanny ability to weave in and out of the references to make the rejections. Such uncanny ability is only provided by hindsight, not by one of low skill in the art.

Further, because of such a low ordinary skill, one of ordinary skill in the art would not look to a cloth particulate screening system, such as Muller, for motivations to benefit an air/liquid system, such as MacDuff. As suggested above, one of such skill in the art would not look to provide cloth filter 2 of Muller to MacDuff because it is fundamentally different system and it would clog MacDuff. As such, one of such low skill in the art would also not look to provide the support and pulsation structure of Muller (tubes 1 and 5) to the cross-flow system of MacDuff.

Furthermore, the Official Action fails to fully consider or address the negative consequences of some of the proposed combinations. For example, providing MacDuff with a plurality of tubes rather than the single disclosed element will increase the expense of MacDuff with no demonstrated increase in functionality of MacDuff. As stated above, MacDuff appears to be a multi-pass system. Because the liquid of MacDuff will pass over element 17 multiple

times, additional elements 17 as suggested by the rejection, will not predictably increase the ultimate air removal provided by element 17. Further, as stated above, MacDuff already provides a structure for allowing further downstream contact. Thus, the suggested combination adds expense to MacDuff without adding any predictable improvement of the ultimate functionality.

Yet another negative consequence of the proposed combination is that the functionality of MacDuff would be significantly reduced or destroyed. If the "elongated core" of Muller is provided on the device of MacDuff, it will interfere with float 22. Such interference will limit or disable the ability of MacDuff to vent. Such an inability to vent, will limit the functionality of MacDuff. Even with such negative results, the Official Action continues with such hindsight combinations. On page 19, first full paragraph, the Official Action suggests that the central tube need not be elongated within the apparatus of MacDuff. First, the Official Action provides no teaching to shorten central tube 5 of Muller. Further, without being elongated, central tube 5 of Muller appears to lose its ability to support tubes 1 of Muller against gravity. Once again, the Official Action suggests modifications that lead to loss of performs and inoperability.

As stated in the Declaration of Aaron Schipper (Evidence Appendix, see paragraph 7), the device described in the present application provided several unexpected positive results. These include unexpected abilities to remove small particles (i.e. 5 microns or less) and the abilities to remove light particles (i.e. those that are less dense than the liquid in which they are carried). The Official Action dismisses the Declaration of Aaron Schipper because no data was provided (see page 18, first full sentence). Consistent with the Official Action's ignoring the multitude of reasons why the proposed combination does not make common sense, the Official Action ignores the data provided in the Declaration of Aaron Schipper 7 (see Evidence Appendix, paragraph 7). Actual consideration of these unexpected results by the Board is respectfully requested.

As stated throughout, the Official Action has fallen into the trap of using hindsight to formulate most, if not all, of the rejections. The rejections pick and chose features from various applied references without much, if any regard, for the logic or negative consequences of the proposed combinations.

The haphazard selection of different components of these much different systems (MacDuff, Elmi, and Muller) to formulate the claimed invention is one of many indications that the Official Action is relying on the teachings of the present application rather than the

references themselves or common sense to form the rejections. Claims 27-29, 43-45, and 62 depend from claim 1 and are also believed to be in condition for allowance, which is respectfully requested. Claims 32-35, 51, and 52 depend from claim 31 and are also believed to be in condition for allowance, which is respectfully requested.

Claim 28

The Official Action suggests that Elmi teaches the limitations of claim 28. However, the Official Action provides no reason for modifying MacDuff to include these features. Thus, the Official Action has failed to satisfy the *prima facia* requirements to support an obviousness rejection. Furthermore, as shown in Fig. 1 of Elmi, tube assembly 20 that includes tubes 32 appear to be a freestanding structure, thus requiring the structure of container 42. However, MacDuff already includes a structure, namely the housing of coupling 12, which provides support for element 17, as shown in Fig. 1. Thus, there is no demonstrated need in MacDuff for the redundant support and additional expense provided by container 42. Once again, the Official Action ignores commons sense and provides unnecessary/redundant structures in an effort make a claim rejection while ignoring the downside of the proposed combination. Removal of the rejection of claim 28 is respectfully requested.

Claim 29

As with claim 28, the Official Action suggests that Elmi teaches the limitations of claim 29. Again, the Official Action provides no reason for modifying MacDuff to include these features. Thus, the Official Action has failed to satisfy the *prima facia* requirements to support an obviousness rejection. Furthermore, claim 29 requires "a band wrapped around the coupling element." In rejecting claim 28 above, the Official Action suggests the claimed coupling element is the cubic frame shown in Fig. 2 of Elmi. The Official Action fails to provide a reference to the band wrapped around the cubic frame. On page 20, the Official Action suggests that the "strap wrapped around the middle of the cubic structure" is the claimed band. However, this strap is not wrapped around the coupling element as required by the claim. As a result, proposed combination fails to teach each and every limitation of the claim. Removal of the rejection of claim 28 is respectfully requested.

Claim 62

Claim 62 requires, among other requirements, that at least one of a plurality of elongate coalescing medium assemblies is centered between other assemblies. The proposed combination falls to teach or suggest any of this combination. Thus, the Official Action has failed to satisfy the *prima facia* requirements to support an obviousness rejection.

Claim 32

Claim 32 requires an end cap having a recess that receives an elongated core element. The Official Action suggests that "the upper part of 40" of MacDuff is an end cap including a recess receiving an elongated core. Note that element 40 is already relied upon in the Official Action as the claimed shell. The Applicant suggests that the upper part of 40 of MacDuff is not an end cap. For one, it doesn't cap anything. Upper part of 40 is clearly open and only capped by correctly identified "cap 16" of MacDuff, which does not include a recess that receives an elongated core. Furthermore, a negative consequence of the proposed combination is that the functionality of MacDuff would be significantly reduced or destroyed. If the "elongated core" of Muller is provided in "the upper part of 40" of MacDuff, it will once again interfere with float 22. Such interference will limit or disable the ability of MacDuff to vent. Such an inability to vent, will limit the functionality of MacDuff. Even with such negative results, the Official Action continues to rely on hindsight combinations. Once again, the Official Action suggests modifications that lead to loss of performs and inoperability and ignores common sense.

Claim 34

Another example of selective picking and choosing among references comes to light in the rejection of claim 34, which is also inconsistent with the rejection of base claim 31. The Official Action relies on Elmi to show a plurality of tubes and suggest the benefit of downstream tubes. As admitted by the Official Action, Elmi does not teach the tubes arranged in a substantially circular pattern. As shown in Figure 2 of Elmi, the tubes are arranged in rows such that liquid may pass through multiple downstream tubes. The rejection of claim 34 ignores this downstream arrangement of the proposed combination and the alleged benefit of further downstream filtering. Rather, the Official Action suggests arranging the plurality of tubes in a circular pattern, which will result in several of the tubes having fewer or no upstream or

downstream tubes than if arranged in the rows of Elmi. Thus, to make the rejection of base claim 31, the Official Action suggests a motivation for providing downstream tubes to MacDuff in one breath and then provides a combination that results in few or no downstream tubes in another breadth. Rather than adopt the full, alleged teaching of Elmi, the Official Action elects to use hindsight to pick and chose from the alleged teachings from Elmi resulting in a rejection that is inconsistent with the motivation of the base rejection of claim 31. Further, the Official Action suggests that providing the tubes in a circular pattern will better fit the shell taught by MacDuff. The "shell" of MacDuff is designed to hold a single element 17, whereas the square housing 42 of Elmi is designed to hold multiple tubes 32. Once again, rather than adopting the teaching Elmi that is already designed to hold multiple tubes 32, the Official Action weaves its way to using a circular shell that does not hold multiple tubes. Removal of the rejection of claim 34 is respectfully requested.

REJECTION OF CLAIMS 36-40, 41, 42, 53-57, AND 59 AS UNPATENTABLE OVER MACDUFF IN VIEW OF ELMI AND SCHWARTZ

Claim 36

The Official Action rejects claims 36-42, 53-57, and 59 as being unpatentable over MacDuff, in view of Elmi, and Schwartz with or without additional references. The unsuitability of combining MacDuff with Elmi is addressed above with respect to claims 1 and 31.

In the rejection of claim 36, the Official Action states that the diffuser 40 of Schwartz is structurally equivalent to the claimed wire mesh retaining wall. As supported by the Declaration of Aaron Schipper (see Evidence Appendix, paragraph 8), the Applicant respectfully disagrees. The object of the claimed wire mesh retaining wall is to limit flow restriction, whereas the object of the diffuser 40 of Schwartz is to diffuse and distribute liquid (see column 2, lines 12 and 13) which gives the device of Schwartz "a superior performance", each of which requires flow restriction to direct the fluid. This is accomplished by limiting the size and number of holes in diffuser 40. Whereas the claimed wire mesh retaining wall inherently attempts to maximize the size and number of holes as evidenced by the wire size described in the present application (see page 7, paragraph [0019] and the comparatively large openings as shown in Fig. 2 of the present application. Further, it is unclear whether such a diffuser would provide any benefit to the claimed plurality of wire mesh tubes in the proposed combination. It appears such a diffuser

would limit the flow of liquid to the inner portion of the cylinder limiting the alleged downstream benefit of multiple tubes. Thus, the result of providing diffuser 40 of Schwartz appears to cut against the suggested motivation for provide multiple tubes. Once again, the Official Action provides a combination based on inconsistent motivations for making the combination. Furthermore, Schwartz touts the "superior performance" of diffuser 40. To provide wire mesh that is less likely to "diffuse and distribute" would likely detract from this superior performance. Thus, modifying diffuser 40 of Schwartz to be made of wire and providing it to the alleged combination of MacDuff and Elmi does not make common sense and is not obvious to one of ordinary skill in the art. Removal of the rejection of claim 36 is requested. Claims 37-42, 53-57 and 59 depend from claim 36 and are believed to be in condition for allowance.

Claim 41

The Official Action indicated that Elmi teaches at least one elongated core element that supports the plurality of wire mesh tubes against the flow of liquid. Schwartz and MacDuff fail to teach such an elongated core. As a result, the Official Action has failed provide a *prima facia* basis for rejecting this claim. Removal of the rejection of claim 41 is respectfully requested.

REJECTION OF CLAIMS 21-26, 49, AND 50 AS UNPATENTABLE OVER MACDUFF IN VIEW OF ELMI AND KUSTER OR MANNION

Claim 21

The unsuitability of combining MacDuff with Elmi is addressed above with respect to claims 1 and 31. In the rejection of claims 21-23, 49, and 50 over MacDuff in view of Elmi and Kuster or Mannion, the Official Action states that the claim recites a change in dimension. No where does claim 21 recite a dimension. Rather, claim 21 recites relative positions of various portions of the wire mesh tubes. Further, the placement of these portions will affect the performance of MacDuff because it will change the amount of element 17 directly in the flow path. Further, this rejection of claim 21 relies on a combination of either Kuster or Mannion, but fails to provide any ***reason*** whatsoever to modify MacDuff to have any feature of Kuster or Mannion. This failure is yet another example of the use of hindsight, rather than prior art teaching, to formulate a reason to reject the claims.

The selection of Mannion as the basis of the rejection is still further evidence of this use of hindsight. As with Muller, Mannion is a particle screening system. Screen 37 of Mannion is designed to capture particles before they can clog orifice 35. Without the use of hindsight, one of ordinary skill in the art (discussed above) would not look to such a screen 37 for use in the fundamentally different system of MacDuff.

Furthermore, the proposed combination is inconsistent with itself. First, the Official Action suggests increasing the efficiency of MacDuff by providing additional materials of Elmi, which the Applicant does not agree with, then the Official Action suggests, without reason, removing the additional material from the flow path. These two suggestions are inconsistent with each other. Because this inconsistency is not supported by any reason or the prior art, it must the direct result of impermissible hindsight. Claims 22-26, 49 and 50 depend from claim 21 and are also believed to be in condition for allowance.

REJECTION OF CLAIM 5 AS UNPATENTABLE OVER MACDUFF IN VIEW OF ELMI AND MULLER AND BLACE

Claim 5

The unsuitability of combining MacDuff with Elmi is addressed above with respect to claims 1 and 31. The rejection of claim 5 is incomplete. The Official Action states that plate 16 includes a plurality of recesses "(formed by member (94))" of Blace. Blace describes 94 as a cross wire. It is unclear how a cross wire can define a plurality of recesses in plate 16. Thus, the Official Action has failed to provide support for this rejection and failed to establish a case of *prima facia* obviousness.

Further, this rejection is one of several examples in which the Official Action relies on up to four prior art references. While patching together these (and the other references), the Official Action has ignored all indicators pointing away from the suggested combination. For example, like Muller and Mannion, Blace is a screen filtering system that captures particles. See bags 10 that are used to screen the particles. Once again, the Official Action reaches far and wide to a different type of filtering system in an attempt to formulate a combination to support a rejection. Not only does the Official Action use components from four different systems to formulate the combination, it fails to show each limitation of the claim as discussed above.

Additionally, if the end cap of Blace is provided to MacDuff as suggested by the Official Action, float 22 of MacDuff will, once again, be unusable for its intended purpose. If cap 16 of MacDuff is replaced by the end cap of Blace to secure the tubes in place as suggested by the Official Action, the tubes would interfere with float 22 because there is not sufficient room between the between plate 16 of Blace and filter pages 10.

REJECTION OF CLAIM 30 AS UNPATENTABLE OVER MACDUFF IN VIEW OF ELMI AND MULLER AND BASSE

Claim 30

The unsuitability of combining MacDuff with Elmi and Muller is addressed above with respect to claims 1 and 31. In another example of a four-way combination, claim 30 was rejected over MacDuff, in view of Elmi, in view of Muller, and in view of Basse. In perhaps the most extreme case of hindsight reconstruction, the Official Action suggest that the three-way combination of MacDuff, Elmi, and Muller should be modified with the teachings of the "Packing Element" of Basse that bears no apparent functional relationship to the other combined filtering systems. Rather, the packing element is configured to promote the transfer of substances between gas streams and liquid streams (see Background of the Invention). The Official Action first states that guide surfaces 16 define flow paths (for sludge) and then suggests that these guide surfaces (which are preferably extruded) can be made of wire mesh because it would be an "obvious structural equivalent." No basis for this alleged structural equivalence is provided. Further, it is difficult, if not impossible, to understand how a plastic extrusion is structurally equivalent to wire mesh. It is even more difficult to understand how wire mesh can possibly define a flow path as it will allow materials to pass through, not define a flow path. Once again, the Official Action selects bits and piece of an unrelated reference to formulate a rejection. Further, the Official Action is again inconsistent. First, the Official Action suggests providing feature of Basse to provide a flow path. Then the Official Action further modifies the Basse by providing wire mesh to destroy the alleged flow paths. Removal of the rejection of claim 30 is respectfully requested.

VIII. Conclusion

In view of the above, Applicant respectfully submits that the present application is in order for allowance and respectfully request the Honorable Board of Appeals to direct the Examiner to withdraw the Final Action and issue a Notice of Allowance.

Respectfully submitted,
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CLAIMS APPENDIX

Listing of Claims:

1. (Previously Presented) An apparatus for removing air or debris from a flow of liquid, the apparatus comprising:

a shell having an inlet, an outlet, and an inner cavity in fluid communication with each of the inlet and the outlet; and

at least one elongate coalescing medium assembly disposed within the cavity of the shell, each coalescing medium assembly including a plurality of wire mesh tubes oriented substantially parallel to each other, each wire mesh tube having ends, a longitudinal axis extending between the ends, and a side wall extending between the ends, and the flow of liquid being directed to travel in a radial direction across the plurality of wire mesh tubes to radially enter and radially exit the side walls of the plurality of wire mesh tubes; the at least one assembly further including at least one elongate core element contacting the plurality of wire mesh tubes and oriented substantially parallel to the plurality of wire mesh tubes, the elongated core element having a rigidity greater than the wire mesh tubes to support the plurality of wire mesh tubes against the flow of liquid in the radial direction across the plurality of wire mesh tubes.

2-4. (Cancelled).

5. (Previously Presented) The apparatus of Claim 1, further comprising an end cap including a plurality of recesses, an end of each of the core elements being received in a respective one of the recesses.

6-20. (Cancelled)

21. (Previously Presented) An apparatus for removing air or debris from a flow of liquid, the apparatus comprising:

a shell having an inlet, an outlet, and an inner cavity in fluid communication with each of the inlet and the outlet, the inner cavity having a direct flow path space positioned directly between the inlet and outlet, and

a plurality of tubes positioned within the inner cavity of the shell such that the tubes are oriented substantially parallel to each other and upper ends of the tubes being positioned above the inlet, each of the tubes having a longitudinal axis, and at least one of the tubes having a surface with a plurality of apertures, a minority portion of the plurality of tubes

being positioned in the direct flow path space with the flow of fluid between the inlet and outlet flowing directly across the minority portion of the plurality of tubes in a substantially radial direction, a majority portion of the plurality of tubes being larger than the minority portion of the plurality of tubes and positioned outside of the direct flow path space; and

an air vent positioned to release air that is removed from the flow of liquid by the plurality of tubes.

22. (Previously Presented) The apparatus of Claim 21, wherein the flow of liquid flows into and out of the tubes in a direction substantially transverse to the longitudinal axes of the tubes.

23. (Previously Presented) The apparatus of Claim 21, wherein the air vent is positioned above the plurality of tubes.

24. (Previously Presented) The apparatus of Claim 21, wherein the shell further comprises a bottom section including an aperture that is substantially smaller than the inlet and configured to permit removal of debris that settles out of the flow of liquid.

25. (Previously Presented) The apparatus of Claim 21, wherein the shell further comprises a bottom section that is removably attached to the remainder of the shell.

26. (Previously Presented) The apparatus of Claim 21, wherein the shell further comprises a bottom section including a valve configured to permit selective removal of debris that settles out of the flow of liquid.

27. (Previously Presented) The apparatus of Claim 1, wherein the ends of each wire mesh tube are positioned at first and second longitudinal positions along the longitudinal axis, and the outlet has a longitudinal position between the first and second longitudinal positions of the ends.

28. (Previously Presented) The apparatus of Claim 1, wherein each coalescing medium assembly further includes a coupling element surrounding the plurality of wire mesh tubes and holding the plurality of wire mesh tubes together.

29. (Previously Presented) The apparatus of Claim 28, wherein each coalescing medium assembly includes a band wrapped around the coupling element and holding the coupling element in engagement with the plurality of wire mesh tubes.

30. (Previously Presented) The apparatus of Claim 1, wherein at least one of the wire mesh tubes includes a wire mesh projection extending from an inner surface of the wire mesh tube and into an interior of the wire mesh tube.

31. (Previously Presented) An apparatus for removing air or debris from a flow of liquid, the apparatus comprising:

a shell having an inlet, an outlet, and an inner cavity in fluid communication with the inlet and the outlet; and

at least one elongate coalescing medium assembly disposed within the inner cavity of the shell, each coalescing medium assembly including:

at least one elongate core element; and

a plurality of wire mesh tubes, each of the wire mesh tubes having a longitudinal axis, the wire mesh tubes cooperating to define at least one interior space therebetween, and the at least one elongate core element having a rigidity greater than the plurality of wire mesh tubes and being positioned within the interior space in an orientation substantially parallel to the plurality of wire mesh tubes to support the plurality of wire mesh tubes against the flow of liquid through the apparatus.

32. (Previously Presented) The apparatus of Claim 31, further comprising an end cap including at least one recess, an end of each of the elongate core elements being received in a respective one of the recesses.

33. (Previously Presented) The apparatus of Claim 31, wherein the elongate core element comprises a cylindrical tube.

34. (Previously Presented) The apparatus of Claim 31, wherein the wire mesh tubes are arranged in a substantially circular pattern when viewed along the longitudinal axes of the wire mesh tubes such that each wire mesh tube engages two adjacent ones of the wire mesh tubes.

35. (Previously Presented) The apparatus of Claim 31, wherein the plurality of wire mesh tubes are formed of substantially horizontal wires and interconnected substantially vertical wires.

36. (Previously Presented) An apparatus for removing air or debris from a flow of liquid, the apparatus comprising:

a shell having an inlet, an outlet, and an inner cavity in fluid communication with each of the inlet and the outlet; and

at least one elongate coalescing medium assembly disposed within the inner cavity of the shell, each coalescing medium assembly including a plurality of wire mesh tubes oriented substantially parallel to each other, each wire mesh tube having ends and a longitudinal axis extending between the ends, and the flow of liquid flowing in a direction substantially transverse to the longitudinal axis of the plurality of wire mesh tubes, each coalescing medium assembly further comprising a wire mesh retaining wall surrounding the plurality of tubes.

37. (Previously Presented) The apparatus of Claim 36, wherein the ends of each wire mesh tube are positioned at first and second longitudinal positions along the longitudinal axis, and the outlet has a longitudinal position between the first and second longitudinal positions of the ends.

38. (Previously Presented) The apparatus of Claim 36, further comprising an air vent positioned above the plurality of wire mesh tubes to release air that is removed from the flow of liquid by the plurality of wire mesh tubes.

39. (Previously Presented) The apparatus of Claim 36, wherein the shell further comprises a bottom section that is removably attached to the remainder of the shell.

40. (Previously Presented) The apparatus of Claim 36, wherein the shell further comprises a bottom section including a valve configured to selectively remove debris that settles out of the flow of liquid.

41. (Previously Presented) The apparatus of Claim 36, wherein the at least one coalescing medium assembly further comprises at least one elongate core element oriented substantially parallel to the plurality of wire mesh tubes to support the plurality of wire mesh tubes against the flow of liquid through the apparatus.

42. (Previously Presented) The apparatus of Claim 36, wherein each wire mesh tube includes a sidewall extending between the ends and the liquid enters and exits the sidewalls while passing through the wire mesh tubes.

43. (Previously Presented) The apparatus of Claim 1, wherein the outlet is substantially devoid of flow restrictions.

44. (Previously Presented) The apparatus of Claim 1, wherein the inlet has a minimum cross-sectional area of flow and the outlet has a minimum cross-sectional area of flow that is substantially equal to the minimum cross-sectional area of flow of the inlet.

45. (Previously Presented) The apparatus of Claim 1, wherein the inner cavity of the shell has an interior diameter and the plurality of wire mesh tubes have diameters and the diameter of each of the plurality of wire mesh tubes is substantially less than the interior diameter of the inner cavity.

46. (Previously Presented) The apparatus of Claim 1, wherein the flow of fluid enters the wire mesh tubes by passing through wire mesh of the tubes.

47. (Previously Presented) The apparatus of Claim 1, wherein the velocity of the flow of fluid is substantially greater in the inlet than in the cavity of the shell.

48. (Cancelled).

49. (Previously Presented) The apparatus of Claim 21, wherein the outlet is substantially devoid of flow restrictions.

50. (Previously Presented) The apparatus of Claim 21, wherein the inlet has a minimum cross-sectional area of flow and the outlet has a minimum cross-sectional area of flow that is substantially equal to the minimum cross-sectional area of flow of the inlet.

51. (Previously Presented) The apparatus of Claim 31, wherein the inner cavity of the shell has an interior diameter and the plurality of wire mesh tubes have diameters and the diameter of each of the plurality of wire mesh tubes is substantially less than the interior diameter of the inner cavity.

52. (Previously Presented) The apparatus of Claim 31, wherein the flow of fluid enters the wire mesh tubes by passing through wire mesh of the tubes.

53. (Previously Presented) The apparatus of Claim 36, wherein the outlet is substantially devoid of flow restrictions.

54. (Previously Presented) The apparatus of Claim 36, wherein the inlet has a minimum cross-sectional area of flow and the outlet has a minimum cross-sectional area of flow that is substantially equal to the minimum cross-sectional area of flow of the inlet.

55. (Previously Presented) The apparatus of Claim 36, wherein the inner cavity of the shell has an interior diameter and the plurality of wire mesh tubes have diameters and the

diameter of each of the plurality of wire mesh tubes is substantially less than the interior diameter of the inner cavity.

56. (Previously Presented) The apparatus of Claim 36, wherein the flow of fluid enters the wire mesh tubes by passing through wire mesh of the tubes.

57. (Previously Presented) The apparatus of Claim 36, wherein the velocity of the flow of fluid is substantially greater in the inlet than in the cavity of the shell.

58. (Cancelled).

59. (Previously Presented) The apparatus of Claim 36, wherein the plurality of wire mesh tubes include a plurality of openings of about 0.25 inches.

60. (Previously Presented) The apparatus of Claim 21, wherein a first segment of the majority portion of the plurality of tubes is positioned below the direct flow path space and the first segment is larger than the minority portion of the plurality of tubes.

61. (Previously Presented) The apparatus of Claim 60, wherein a second segment of the majority portion of the plurality of tubes is positioned above the direct flow path space across the direct flow path space from the first segment and the second segment is larger than the minority portion of the plurality of tubes.

62. (Previously Presented) The apparatus of Claim 1, wherein the at least one elongate coalescing medium assembly includes a plurality of elongate coalescing medium assemblies and at least one of the elongate coalescing medium assembly is centered between the other elongate coalescing medium assemblies.

EVIDENCE APPENDIX

DECLARATION OF AARON SCHIPPER

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No.	:	10/762,095	Confirmation No. 4559
Applicant	:	Aaron Schipper	
Filed	:	01/21/2004	
TC/A.U.	:	1723	
Title	:	Apparatus for Removing Air and/or Debris from a Flow of Liquid	
Examiner	:	Benjamin M. Kurtz	
Docket No.	:	TCI-P003	
Customer No.	:	27268	

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Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

DECLARATION UNDER 37 C.F.R. § 1.131 OF AARON SCHIPPER

I, Aaron Schipper, the inventor of the invention disclosed and claimed in the above-identified patent application, hereby declare as follows:

1. I have a degree in Mechanical Engineering Technology from Purdue University. I have been experience in the field of hydronics of about 13 years. More specifically, I have experience in the field of removing air/or debris from hydronic systems of about 7 years.

2. I consider myself to have to have at least ordinary skill in the art of hydronics and the art of air/or debris removal.

3. I have been informed that the Examiner in the above-identified application objected to the amendment to the specification dated 8/29/07 that amended paragraph [0015] to state that inlet 20 and outlet 22 are devoid of flow restrictions. Figure 1 of the application as filed clearly shows inlet 20 and outlet 22 are devoid of flow restrictions. Thus, the application as filed provides clear support for the amendment to the specification dated 8/29/07. Further, unlike the device of U.S. Patent No. 3,668,822, titled "Flow Resistance Equalizer For Liquid Circulation System", one object of the device shown in Figure 1 of the present application is to have minimal impact on the rate of flow of fluid through inlet 20 and outlet 22 to increase

the efficiency of the hydronic system. I believe one of ordinary skill in the art of hydronics would recognize this objective. To provide a flow restriction in inlet 20 and/or outlet 22 would defeat this objective. Thus, in further support of what is shown in Figure 1, I believe it is in inherent that inlet 20 and outlet 22 are devoid of restrictions.

4. I have been informed that the Examiner is relying on U.S. Patent No. 6,893,485 to MacDuff to support a rejection of claims 1, 27-29, 31-38, 41, 42, 48-49, and 62. Based on my experience in the field of hydronics, the device of MacDuff appears to be designed for use in a hydronic system to remove air from a liquid. In a hydronic system, such as a radiant heat system, the fluid would cycle over the device of MacDuff multiple times. With each pass, more air would likely be removed.

5. I have been informed that the Examiner is relying on U.S. Patent No. 5,500,132 to Elmi to support the rejection of claims 1, 27-29, 31-38, 41, 42, 48-49, and 62. Based on my experience in the field of hydronics, the device of Elmi does not appear be by intended for use in a hydronic system. Rather, the device of Elmi appears be generally intended to remove oil from water in a single pass system.

6. MacDuff generally relates to removal of air from a liquid. Elmi generally relates to removing liquid from liquid. Because of the unpredictablity of fluid mechanics, when compared to other mechanical arts, it is difficult to predict whether the coalescing functions of a liquid/liquid system would carryover to an air/liquid system. Thus, it is difficult to predict whether the coalescing functions of Elmi will carryover to MacDuff.

7. The device described in the present application provides unexpected results. In an effort to determine the effectiveness of the device, tests were performed demonstrating the ability of the device to remove particles and oxygen from a liquid. Unexpectedly, the device was very effective in removing small particles (5 microns or less). For example, test results indicate that 95.2% of particles of this size were removed in 1440 minutes of circulation. This degree of removal was unexpected. Further, the device described in the present application was very effective at remove "light" particles (i.e. those having a density less than the liquid). For example, test results indicate that 99.33% of cellulose was removed from water in 540 minutes of circulation. This ability to remove light particles was unexpected. Another indicator of the effectiveness of the device described in the present application is its ability to remove air from a hydronic system. For example, observations indicate that so

much air is removed by the device that air pockets are eliminated in other parts of the hydronic system. It is believed that water that passes through the device contains so little air that it adsorbs air from other parts of the hydronic system (i.e. air pockets) that is then removed by the device. Eventually the air pockets are eliminated, which eliminates problems associated with air pockets in hydronic systems.

8. I have been informed that the Examiner is relying on U.S. Patent No. 5,676,740 to Schwartz to support the rejection of claims 36-38, 41, 42, 53-57, and 59. As part of the rejection, the Official Action states that the diffuser 40 of Schwartz is "an obvious structural equivalent" to the claimed "wire mesh retaining wall." As shown in Schwartz and described therein, diffuser 40 is a cylindrical sleeve having holes that diffuse and distributes the liquid. As such, diffuser 40 acts as a flow restrictor that distributes fluid around the perimeter of brush set 36. As shown in Figure 2 of Schwartz, the majority of the surface area of the cylindrical sleeve is not occupied by holes, unlike wire mesh retaining wall 52 of the present application. Unlike diffuser 40 of Schwartz, one object of the claimed wire mesh retaining wall is to reduce the any flow restriction. Further, because of the limited flow restriction, the wire mesh retaining wall has little, if any ability to diffuse or distribute liquid to the claimed wire mesh tubes. Based on this, I do not believe the diffuser 40 of Schwartz is structurally equivalent to the claimed wire mesh retaining wall.

9. I hereby declare that all statements made herein of my own knowledge are true, and that all statements made on information and belief are believed to be true; and further that these statements are made with the knowledge that willful false statements, and the like so made are punishable by fine or imprisonment, or both, under Section 1001, Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Date: 4-2-08

By: Aaron Schipper
Aaron Schipper

RELATED PROCEEDINGS APPENDIX

NONE